

The effect of AIDS on maternal mortality in Malawi and Zimbabwe

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The AIDS epidemic in sub-Saharan Africa has had a significant impact on levels of pregnancy-

related mortality. Nationally representative surveys in Malawi and Zimbabwe indicated that pregnancy-related mortality risks have increased 1.9 and 2.5 times, respectively, during the past decade, concomitant with a nearly 10-fold increase in the prevalence of HIV among pregnant women. The increase is more pronounced in

urban populations. These observations have important implications for intervention strategies and monitoring in the context of safe motherhood programmes.

In many countries in sub-Saharan Africa high levels of maternal mortality now co-exist with high levels of HIV prevalence among women of childbearing ages [1]. HIV/AIDS may increase pregnancy-related mortality rates through an increase in direct (e.g. puerperal infection) or indirect obstetric deaths (e.g. anemia or tuberculosis aggravated by pregnancy, or HIV progression itself being worsened by pregnancy), but HIV may also be incidental to the pregnancy (i.e. fortuitous death). Little empirical evidence exists on the interaction between HIV/AIDS and pregnancy. In a population-based longitudinal study in Rakai, Uganda [2], maternal mortality was 1687 and 310 per 100 000 live births among HIV-positive and HIV-negative women, respectively. In hospitals in South Africa, indirect causes accounted for as many as half of all maternal deaths, and AIDS was the second most common cause of maternal death [3]. Maternal mortality among HIV-infected women in a tertiary hospital in Durban, South Africa, was more than double the mortality rate among HIV-negative women, and the attributable fraction of overall deaths as a result of HIV infection was 15.9%. Mortality risks were most elevated among women with HIV-tuberculosis co-infection [4]. In a university teaching hospital in Zambia, maternal mortality rates increased considerably during the 1990s, and the increase was mainly caused by non-obstetric causes, notably malaria, HIV-associated tuberculosis, and unspecified chronic respiratory illnesses [5].

During the 1990s, Malawi and Zimbabwe each conducted two nationally representative demographic and health surveys that permit the measurement of pregnancy-related mortality. Women aged 15–49 years were asked to provide a detailed account of the survivorship of all the live-born children of their

mother (maternal sibling history), including questions on whether or not the death of each deceased sister occurred during pregnancy, childbirth or the puerperium. These data allow a direct estimate of the levels of all-cause adult and pregnancy-related mortality for the period 5–10 years preceding the survey [6]. A pregnancy-related death is the death of a woman when pregnant or within 6 weeks of the termination of pregnancy, irrespective of the cause of death. The maternal mortality ratio (i.e. pregnancy-related deaths per 100 000 live births) is the pregnancy-related mortality rate divided by the general fertility rate.

In Malawi, the pregnancy-related mortality and overall adult female mortality rates were much higher in the later than in the earlier period (rate ratios 1.72 and 1.76, respectively) (Table 1). As fertility declined marginally, the maternal mortality ratio increased 1.81 times. In Zimbabwe, the large increase in overall female mortality exceeded the increase in pregnancy-related mortality rates (rate ratios 2.80 and 2.12, respectively). The maternal mortality ratio increased 2.5 times.

The increase in pregnancy-related mortality is large and significant, and erases any potential gain in maternal survival achieved by safe motherhood programmes during the preceding decade. What is the cause of the increased risks of pregnancy-related death during the 1990s in Malawi and Zimbabwe? The simplest explanation would be that the increase in pregnancy-related mortality is caused by an increase in HIV prevalence among pregnant and parturient women. Estimates of HIV prevalence, based on data from the national antenatal clinic-based surveillance system, indicate that HIV prevalence among pregnant women in Malawi was approximately 2% during 1986–1992, and approximately 15% during 1994–2000. Assuming that pregnancy-related mortality among HIV-negative women has remained constant over time, and all the increase is caused by HIV, then maternal mortality

Table 1. Period estimates of adult female mortality, maternal mortality rate, general fertility rate and maternal mortality ratio in Malawi and Zimbabwe.

Country	Year of survey	Number of respondents (women 15–49 years)	Period of estimates	Overall mortality per 1000 women 15–49 years (person years)	Pregnancy-related mortality per 1000 women 15–49 years (person years)	General fertility rate per 1000 women 15–49 years	Maternal mortality per 100 000 live births (95% CI) ^a
Malawi	1992	4849	1986–1992	6.5 (51 951)	1.4 (51 951)	0.220	620 (410–830)
	2000	13 220	1994–2000	11.3 (145 174)	2.4 (145 174)	0.210	1120 (950–1288)
			Rate ratio ^b	1.76 (1.56–1.99)	1.72 (1.33–2.25)		1.81 (1.39–2.37)
Zimbabwe	1994	6128	1985–1994	3.3 (114 169)	0.5 (114 169)	0.162	283 (195–371)
	1999	5907	1995–1999	9.1 (58 052)	0.9 (58 052)	0.135	695 (471–919)
			Rate ratio ^b	2.80 (2.45–3.20)	2.12 (1.42–3.17)		2.50 (1.68–3.72)

CI, Confidence interval.

^aMaternal mortality reported in demographic and health surveys is standardized on the household age structure.

^bAge-adjusted rate ratio with 95% confidence limits.

would have been 4389 per 100 000 live births among HIV-infected women (corresponding to a relative risk of 8.1 compared with HIV-negative women). The corresponding figures for Zimbabwe, with an estimated increase of HIV prevalence among pregnant women from 3% during 1983–1992 to 25% during 1995–1999, are a maternal mortality ratio of 2100 per 100 000 live births to HIV-positive women and a relative risk of 9.3.

One might expect a smaller increase in women's mortality risk by HIV status during the maternal period than outside the maternal period. In several studies, the risk of mortality among HIV-infected women during the year postpartum is considerably lower than during other periods of adulthood [7]. Selection factors are probably the primary explanation as pregnant women may be healthier [8] and at less advanced stages of HIV infection [9]. In Malawi, the increase in pregnancy-related mortality is proportional to the increase in all-cause mortality, suggesting that pregnancy and delivery may carry additional mortality risks that offset the advantages generated by the selection bias. In Zimbabwe, where the AIDS epidemic is even more severe than in Malawi, the mortality increase was larger among all causes than among pregnancy-related causes, which could be partly due to the effect of HIV on fertility, as a substantial decrease in fertility was observed in Zimbabwe (Table 1). The decrease in fertility reduces the maternal mortality rate, but has little effect on the ratio.

Surveillance data from antenatal clinics indicate that urban populations were affected earlier and more severely than rural populations during the 1990s. Therefore, one expects a larger increase in maternal mortality rates in urban areas, which is indeed the case in both countries (Fig. 1). Note that no data were collected on the residence of the siblings. Therefore, the maternal mortality data in Fig. 1 are by the

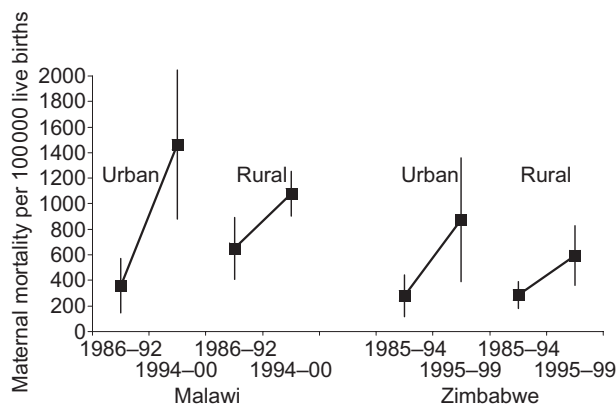


Fig. 1. Maternal mortality ratio trends in Malawi and Zimbabwe during the 1990s (period estimate with 95% confidence limits).

residence of the respondents and not by the residence of the sisters, which would be more accurate.

Two additional explanations need to be considered. There may be a tendency to report the deaths of women of reproductive ages as maternal deaths to avoid the stigmatization associated with a possible AIDS death. Another explanation is that obstetric risk has indeed worsened because of a deterioration in the quality of delivery services. Even if safe motherhood programmes increase the awareness of complications among women and provide information and services to anticipate and respond to problems, HIV-related illnesses may increase crowding in health facilities and affect the quality of maternity services. The demographic and health surveys in both countries do not indicate changes in the utilization of antenatal or delivery care. For instance, the proportion of pregnant women delivering in health facilities remained approximately 55 and 72% in Malawi and Zimbabwe, respectively.

Clearly, further study is required to assess how HIV/AIDS affects pregnancy-related mortality rates. To distinguish the effects of the HIV epidemic from the progress in access to and quality of obstetric services, maternal mortality measurements should separate direct obstetric from other causes. Furthermore, it is essential to consider the probable influence of HIV on maternal outcomes, health service delivery and the behaviour of women. Collaborative initiatives to reduce HIV and maternal mortality need to be developed, and programmes that aim to reduce mother-to-child transmission of HIV are the most logical entry point.

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